

APPENDIX F WATER SUPPLY



260 West Exchange Street, Suite 300
Providence, Rhode Island 02903
tel: 401-751-5360
fax: 401-274-2173

May 22, 2012

The Honorable Thomas C. Hoye, Jr.
Mayor
Taunton City Hall
141 Oak Street
Taunton, MA, 02780

Subject: Evaluation for the Proposed Mashpee Wampanoag Project First Light

Mayor Hoye:

CDM Smith has completed our evaluation of water supply and fire protection for the Proposed Mashpee Wampanoag Project First Light located off of Stevens Street (at the intersection of routes 24 and 140) in the City of Taunton Main Service Area. We are pleased to present our analyses and results in this report.

Description of Development

The proposed project consists of the phased development of an area of land at the intersection of routes 24 and 140 in the City of Taunton. Whereas there are four proposed phases for construction, this evaluation broke them into two phases for this evaluation. In total the proposed project consists of approximately a 150,000 sq. foot Casino with approximately 300 food court seats, a 145 seat restaurant, a 165 seat restaurant, a 400 seat buffet area, 2500 parking spaces in structured parking and 10 to 12 small retail stores. In addition there will also be three 300 room hotels, a 200 seat coffee shop/restaurant and a indoor/outdoor water park.

For this evaluation, Phase I was modeled to include the demand need at the Main entrance on Stevens Street. This includes the demand for Renovations/Expansion to the Maggiore Buildings, Parking Structure/Transportation Center, 300 Room Resort Hotel, Retail, Future 300 Room Hotel, Future 200 Seat Restaurant/Coffee Shop. The average water usage for Phase I is anticipated at 167,850 gallons per day (GPD). Phase II was modeled to include the demand need at the Future entrance on Hart Street. This includes the demand for the Future Water Park and 300 Room Hotel and Events Center, which is anticipated to be about 47,100 GPD. Table 1 summarizes the flow information received from the JCJ Architecture.

Fay, Spofford & Thorndike, Inc. (FST) has proposed the following two connections to the City of Taunton's Water System for the proposed project.





Mayor Thomas C. Hoyer, Jr.
May 22, 2012

Page 2

- Proposed Main Entrance – Stevens Street
- Proposed Emergency Entrance – Hart Street

It is recommended that appropriate water main be provided that loops through the site and connects Stevens Street to Hart Street hydraulically. CDM Smith evaluated the ability of the Taunton Water distribution system to meet current and future water supply requirements of the proposed project at each location (i.e. each connection could provide total development flows if needed). The attached **Figure 1** shows the proposed connection locations.

Evaluation

CDM Smith evaluated the proposed project under two main criteria for water supply. First, we assessed the ability of the existing system to provide adequate pressures to service the project area under domestic day demands (i.e., average day and maximum day flow conditions). Secondly, we evaluated the existing system to provide adequate residual pressures under a maximum day flow with a required fire flow. Under all supply scenarios, CDM Smith also assessed the potential impacts caused by the proposed project on the existing water service customers.

For new facilities, the Massachusetts Department of Environmental Protection (MA DEP) has imposed a standard that the water supply system must provide a minimum pressure of 35 pounds per square inch (psi) under all domestic demand conditions. In addition, the National Fire Protection Association and MA DEP require the pressures throughout the system must remain above 20 psi under maximum day demand with fire flow conditions.

The Taunton Water Division's existing water distribution model was modified to include water service at the proposed main entrance to the project location on Stevens Street and the proposed emergency entrance on Hart Street.

For the proposed main entrance at Stevens Street, a new 16-inch main from Middleboro Avenue to the proposed entrance was modeled to supply water to the site from the main service area within Taunton. A new main was modeled because the entrance on Stevens Street is located within the East Taunton high service area, which is not sized for the demand from the proposed facilities. For the proposed emergency entrance at Hart Street we used an existing node on the 24-inch water main on Hart Street. All results pertain to the proposed water service connections at these locations.



Mayor Thomas C. Hoyer, Jr.
May 22, 2012

Page 3

CDM Smith has not evaluated water service, pressure requirements or pressure losses within the site and the proposed facility. Pressure requirements and pressure losses within the future project area and facility are independent of this analysis and being performed by others.

The model was used to examine several water supply and demand conditions. Using the water distribution model, CDM Smith simulated hydraulic conditions in the Main Service Area (MSA) under current system conditions and utilizing proposed demand conditions from JCJ Architecture (**memo attached and summarized in Table 1**). We have presented a summary of the analyses and our findings below.

Domestic Service

Using the Taunton water distribution model, CDM Smith evaluated water supply to the proposed project area under average day (ADD) and maximum day demands (MDD) conditions. **Table 2** (attached) presents the existing pressures at the proposed main and emergency entrances to the facility under existing conditions.

Fire Protection

The Insurance Service Office (ISO) conducts hydrant flow tests to evaluate the ability of a distribution system to fight fires. The last time ISO rated the City of Taunton was in October 1999, when 36 tests were performed. ISO defines needed fire flow as the rate of water flow, at a residual pressure of 20 psi for a specified duration, which is necessary to control a major fire in a specific structure. For this evaluation, this addressed available fire flow at the property line. Fire needs within the project area are being evaluated by others.

To conduct the fire flow simulation in the model, CDM Smith set the Prospect Hill Reservoir at its lowest operating level (assumed at 18.5 feet) at the beginning of the fire flow simulation. CDM Smith established the tank elevation as the level where there would be sufficient water in the tank to provide fire flow, while the maximum day demand would be provided by the Harris Street Pump Station and the Taunton Water Treatment Plant High Lift Pumps. By setting the tank at this water surface elevation for the fire flow simulation, we conservatively assume the worst-case scenario where the maximum amount of system demand is being withdrawn.

Results

CDM Smith has evaluated water supply and hydraulic conditions in the distribution system where the proposed project will receive water supply from the City. Pressure ranges in the Main Service Area for each scenario are shown in **Table 2**. Our evaluation determined that the City's distribution system provides adequate water service for all water supply conditions at the



Mayor Thomas C. Hoyer, Jr.
May 22, 2012

Page 4

proposed Emergency Entrance on Hart Street but will not supply adequate pressure utilizing existing mains at the main entrance on Stevens Street. With both existing and future maximum day demands imposed throughout distribution system, CDM Smith simulated a fire flow of 3500 gallons per minute (gpm) for a duration of 3 hours at either the main or emergency entrances to the proposed project location. The fire flow was based on ISO and AWWA M31 requirements. For both entrances, system pressures remained above the 20-psi requirement, as shown in **Table 2**. The addition of a new dedicated 16-inch main from Middleboro Avenue to the proposed entrance is recommended to provide adequate water service for all water supply conditions and fire flow needs at the Main Entrance.

Recommended Capital Improvements

Based on the results, CDM Smith feels that a new dedicated 16-inch water main should be installed from the 24-inch main in Middleboro Avenue down Pinehill Street to the Main entrance on Stevens Street, to adequately supply the requested domestic water and fire protection demands for the proposed project. The City also experiences water quality issues (i.e. "rusty" water complaints) in the Middleboro Avenue, Hart Street and County Street areas that result from water services being connected to aging, smaller mains. Improvements for these customers are recommended to occur concurrently with the required improvements for the proposed project. The following is a summary of the recommended capital improvements:

- 4,500 feet of 16" water main from the intersection of Pinehill Street and Middleboro Ave, to Stevens Street, to the proposed facility entrance (would include appurtenances like a 24" x 16" tapping sleeve and valve, line valves, fittings, hydrants, etc.)
- All existing customers along this 4,500 foot pipe route would be tied over to the new water main to resolve issues associated with multiple pipes within these streets.
- A 24" x 16" tapping sleeve and valve with up to 30 feet of 16" water main to the customer property line on Middleboro Ave. This will allow for looping of service line through the customers property.
- Two meter vaults (with bypass) at the identified connection locations.
- Final overlay paving on all of Stevens Street from the customer entrance (Rt 140) to the intersection of Stevens Street and Middleboro Ave, as well as Pinehill Street to Middleboro Ave.



Mayor Thomas C. Hoyer, Jr.
May 22, 2012

Page 5

- Police details associated with the construction.
- Replacement of water services on Middleboro Ave, Hart Street and County Street to improve pressure and rectify issues associated with multiple water mains in these streets.
- Engineering design and services during construction.
- Estimated cost for these improvements is \$2.0 million.

The City pays for most of their water system improvements through low interest (2%) State Revolving Fund (SRF) loans. At this time, there is not an available loan that would cover these costs and the scope of the project does not ensure funding in future SRF requests. It is therefore assumed that money would need to be borrowed at current market rates for these improvements.

In addition to capital improvements, the proposed customer connection will be supplied from one of the main distribution pipes for the entire City. Based on the importance of this water main and the associated pumping systems at the Taunton Water Treatment Plant that supply it, it is estimated that there will be the need for \$20,000 annually for additional operation and maintenance to ensure system dependability to the site and surrounding areas.

Items for Consideration in the Inter-Governmental Agreement (IGA)

In addition to the recommended capital improvements described above, it is recommended that the proposed customer connection be prepared similarly to existing Inter-municipal Agreements (IMAs) that the City has with other consecutive system customers. Based on the existing agreements, the following items are recommended for consideration as part of the IGA negotiations:

- The City is responsible for providing service to the location of master meters at the property limit.
- The consumption measured and recorded by the City master meters located at each entrance facility will be the basis for billing.
- Information provided by the customer indicates they need 220,000 gpd on an annual daily average basis once the facility is constructed to the limits presented to this point



Mayor Thomas C. Hoye, Jr.
May 22, 2012

Page 6

(through Phase 4 based on development plan provided). The City will supply up to 220,000 gpd on an annual daily average basis.

- Assuming the improvements described below are constructed, the City will be able to provide a maximum fire flow of 3500 gpm at 20 psi at the master meter locations.
- The City agrees to provide water quality at the master meter locations that complies with all relevant MA DEP and EPA standards.
- The customer is responsible for water quality, pressure and any site specific needs for all system components beyond the master meter.
- The customer should provide a pipe loop through their property to connect the two service connections before completion of what is identified as Phase 4 in the current development strategy.

It should be noted that information received to date for the proposed project DID NOT include water use related to irrigation needs for the facility. The information provided in this evaluation focused on the needs for use within the facilities and were based on the initial utility estimates provided in the attached letter dated April 13, 2012.

As further information related to type of development and facility needs become available, the developer should have discussions with the City of Taunton Fire Department to determine if a lower available fire flow would be acceptable. If a change occurs in the required demand or supply to the proposed project area, CDM Smith recommends performing additional model runs to reevaluate the new demand to the project area.


CDM Smith appreciates the opportunity to perform this study for the City of Taunton. We trust that this report meets your immediate needs. Should you have any questions or have need of additional services, please call me at (401) 457-0329.



Mayor Thomas C. Hoye, Jr.
May 22, 2012

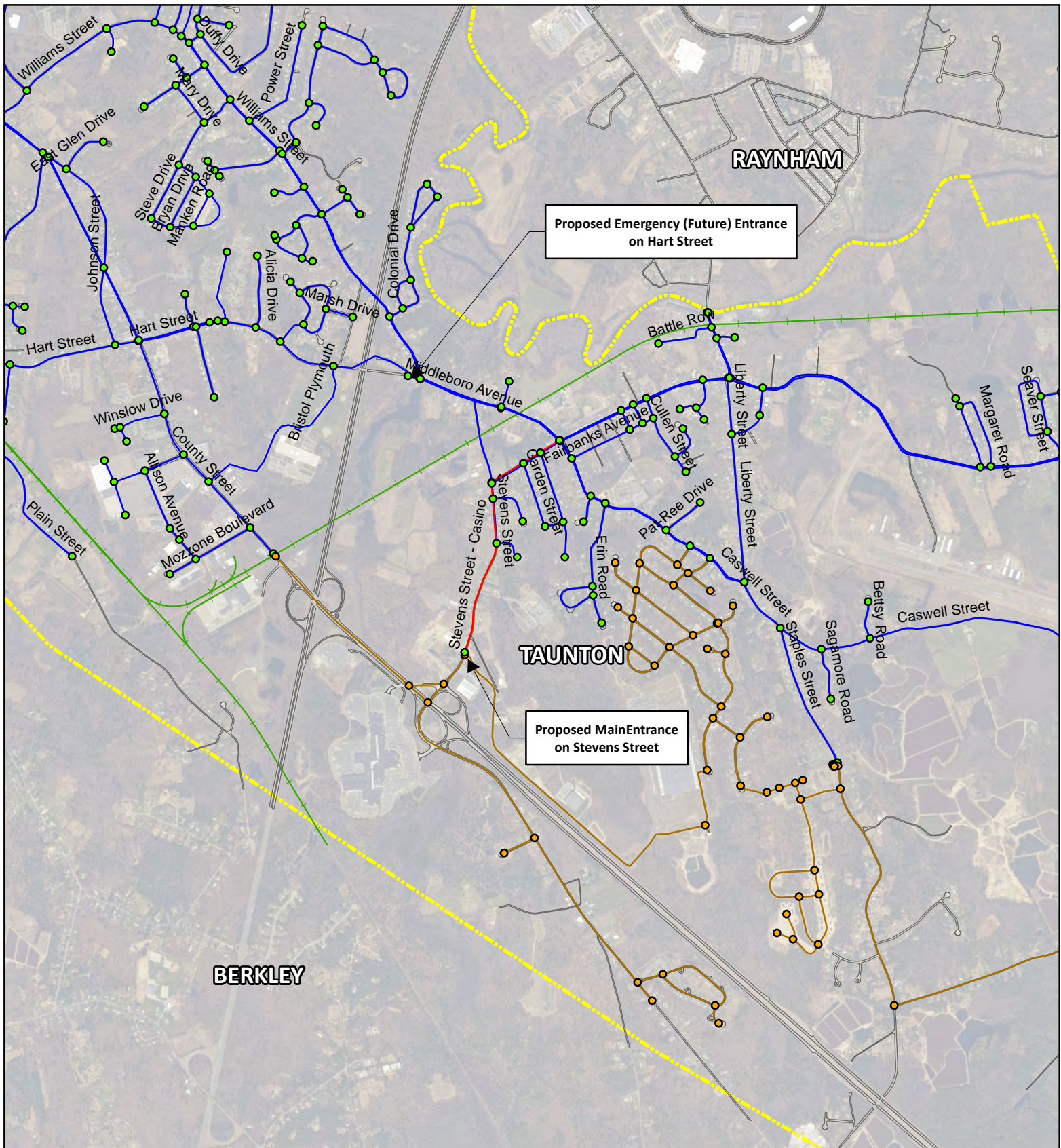
Page 7

Very truly yours,



Benjamin Levesque, P.E., BCEE
CDM Smith Inc.

cc: F. Adam Yanulis (CDM Smith)
Jason Buffington, Esq. (City of Taunton Law Department)



Legend

Model Junction

- Low Service
- East Taunton HSA

Water Main

- Low Service
- East Taunton HSA
- Proposed 16" Water Main

Road Edge Line

—

Railroad Center Line

—

Town Line

—

City of Taunton Massachusetts Water Supply System

0 700 1,400
Feet



**CDM
Smith**

Figure 1
Mashpee Wampanoag
Water Supply and
Fire Protection Evaluation

Phase	Buildings	Peak Flow (gpm)	Average Daily Flow (gpd)	Average Daily Flow (gpm)	Peak Hour Flow (gph)	Peak Hour Flow (gpm)
1	Renovations/Expansion to the Maggiore Buildings	250	75,000	52	12,500	208
	Parking Structure/Transportation Center	94	13,000	9	2,200	37
	300 Room Resort Hotel	275	30,000	21	5,000	83
	Retail	67	6,600	5	1,100	18
	Totals	686	124,600	87	20,800	347
2	Future 300 Room Hotel	275	30,000	21	5,000	83
	Future 200 Seat Restaurant / Coffee Shop	75	13,250	9	2,250	38
	Future Water Park and 300 Room Hotel - Hotel	275	30,000	21	5,000	83
	- Water Park	500	17,100	12	2,900	48
	Totals	1,125	90,350	63	15,150	253
Totals Combined Phase 1 & 2		1,811	214,950	149	35,950	599

Table 1
City of Taunton, Massachusetts
Project First Light
Summary of Water Demands

Water Supply Scenario	Stevens Street Main Entrance ⁽⁴⁾ Water Demand		Hart Street Emergency Entrance ⁽⁵⁾ Water Demand		Required Minimum Pressure (PSI)	Connection at Stevens Street Entrance		Connection at Hart Street Entrance	
	(MGD)	(GPM)	(MGD)	(GPM)		Pressure (PSI)	Hydraulic Grade Line (FT)	Pressure (PSI)	Hydraulic Grade Line (FT)
Existing ADD	0.00	0	0	0	35	56	195	69	194
Existing ADD ⁽¹⁾ + Phase I ⁽²⁾ & Phase II ⁽³⁾	0.17	117	0.05	33	35	58	199	71	198
⁽⁶⁾ Existing ADD ⁽¹⁾ + Phase I ⁽²⁾ & Phase II ⁽³⁾	0.22	150	0.00	0	35	57	198	71	198
Existing MDD	0.00	0	0.00	0	35	60	205	73	203
Existing MDD ⁽¹⁾ + Phase I & Phase II	1.49	1036	1.12	775	35	57	198	71	198
⁽⁶⁾ Existing MDD ⁽¹⁾ + Phase I & Phase II	2.61	1811	0.00	0	35	57	198	71	199
Existing MDD + Phase II + 3500 gpm fire flow for 3 hours & Phase I	1.49	1036	6.16	4275	20	49	180	63	180
Existing MDD + Phase I + 3500 gpm fire flow for 3 hours & Phase II	6.53	4536	1.12	775	20	29	134	63	180

NOTES:

1. ADD = Average Day Demand; MDD = Maximum Day Demand
2. Phase I was modeled to include the demand need at the Main entrance on Stevens Street. This includes the demand for Renovations/Expansion to the Maggiore Buildings, Parking Structure/Transportation Center, 300 Room Resort Hotel, Retail, Future 300 Room Hotel, Future 200 Seat Restaurant/ Coffee Shop
3. Phase II was modeled to include the demand need at the Future entrance on Hart Street. This includes the demand for the Future Water Park and 300 Room Hotel.
4. The Main Entrance is proposed to be located at the end of Stevens Street. A new 16-inch main from Middleboro Avenue to the entrance was modeled to supply water to the site from the main service area within Taunton.
5. The Future Entrance (Emergency Entrance) is proposed to be located of Hart Street. Demand was modeled off the exiting 24-inch main in Hart Street that is within the main service area in Taunton.
6. Total Demand for Phase I & II are modeled at main entrance at the end of Stevens Street with a 16-inch main looping through the site and connecting Stevens Street to Hart Street.
7. Low pressures below 35 PSI are only found in the highest elevations surrounding the Prospect Hill Tank. These pressures are currently less than 35 PSI and are not the cause of the Phase I Development.

TABLE 2

**City of Taunton, Massachusetts
Mashpee Wampanoag
Water Supply Fire Protection Evaluation**



April 13, 2012

Mr. Bill Dow
JCJ Architecture
38 Prospect Street
Hartford, CT 06103

Re: Mashpee Wampanoag Master Planning Project
Taunton, Massachusetts

Dear Bill:

Based on the preliminary program information provided on 4/11/12, we have determined initial utility estimates that can be used for planning purposes. We have broken this information into the major portions of each intended phase of the project. As the program becomes more defined and plans are developed, we can update this information with further detail.

1. Phase 1:

a. Renovations/Expansion to the Maggiore Buildings:

i. Electrical:

1. Normal Power – 8.6 MVA: This would most likely be provided via multiple utility services or bringing in power at the utility supply voltage (medium voltage) and distributing it to unit substations within the facility. Note that all electrical loads listed are connected load estimates as required by the NEC. Actual demands will be less than these estimates.
2. Generator Power – 4.0 MVA: Multiple medium voltage generators will be provided in parallel.

ii. Water:

1. 6" domestic water main
2. Peak = 250 GPM
3. Average daily flow – 75,000 Gallons per day
4. Peak Hour = 12,500 gallons

iii. Sewer:

1. 8" sanitary sewer main. This would most likely be broke up into multiple connections once the plans are developed and locations are known of venues and site services.

iv. Gas:

1. 46,000 CFH.

- b. Parking Structure/Transportation Center:
 - i. Electrical:
 - 1. Normal Power – 0.5 MVA
 - 2. Generator Power – .2 MVA
 - ii. Water:
 - 1. 3" domestic water main
 - 2. Peak = 94 GPM
 - 3. Average daily flow – 13,000 Gallons per day
 - 4. Peak Hour = 2,200 gallons
 - iii. Sewer:
 - 1. 4" sanitary sewer main.
 - iv. Gas:
 - 1. 500 CFH.
- c. Grade Parking:
 - i. Electrical:
 - 1. Normal Power – 0.05 MVA
 - 2. Generator Power – 0.02 MVA
 - ii. Water, Sewer, Gas: Not anticipated.
- d. 300 Room Resort Hotel:
 - i. Electrical:
 - 1. Normal Power – 3.5 MVA - This would most likely be provided via multiple utility services or bringing in power at the utility supply voltage (medium voltage) and distributing it to unit substations within the facility.
 - 2. Generator Power – 1.5 MVA – (1) large generator would be utilized, or this could be provided from the casino parallel generator location (and add this capacity to that system). This would be determined during schematics.
 - ii. Water:
 - 1. 6" domestic water main
 - 2. Peak = 275 GPM
 - 3. Average daily flow – 30,000 Gallons per day
 - 4. Peak Hour = 5,000 gallons
 - iii. Sewer:
 - 1. 10" sanitary sewer main, or multiple 6" and 8" connections based on coordination with the civil engineer.
 - iv. Gas:
 - 1. 14,000 CFH.

- e. Retail:
 - i. Electrical:
 - 1. Normal Power – 0.5 MVA
 - 2. Generator Power – 0.07 MVA
 - ii. Water:
 - 1. 3" domestic water main
 - 2. Peak = 67 GPM
 - 3. Average daily flow – 6,600 Gallons per day
 - 4. Peak Hour = 1,100 gallons
 - iii. Sewer:
 - 1. 4" sanitary sewer main
 - iv. Gas:
 - 1. 700 CFH.

2. Phase 2:

- a. Future 300 Room Hotel
 - i. Electrical:
 - 1. Normal Power – 3.5 MVA - This would most likely be provided via multiple utility services or bringing in power at the utility supply voltage (medium voltage) and distributing it to unit substations within the facility.
 - 2. Generator Power – 1.5 MVA – (1) large generator would be utilized, or this could be provided from the casino parallel generator location (and add this capacity to that system). This would be determined during schematics.
 - ii. Water:
 - 1. 6" domestic water main
 - 2. Peak = 275 GPM
 - 3. Average daily flow – 30,000 Gallons per day
 - 4. Peak Hour = 5,000 gallons
 - iii. Sewer:
 - 1. 10" sanitary sewer main, or multiple 6" and 8" connections based on coordination with the civil engineer.
 - iv. Gas:
 - 1. 14,000 CFH.
- b. Future 200 Seat Restaurant / Coffee Shop:
 - i. Electrical:
 - 1. Normal Power – 0.6 MVA
 - 2. Generator Power – 0.16 MVA
 - ii. Water:
 - 1. 3" domestic water main
 - 2. Peak = 75 GPM
 - 3. Average daily flow – 13,250 Gallons per day
 - 4. Peak Hour = 2,250 gallons
 - iii. Sewer:
 - 1. 6" sanitary sewer main
 - iv. Gas:
 - 1. 3,300 CFH.

c. Future Water Park and 300 Room Hotel:

i. Electrical:

1. Normal Power – 5.5 MVA
2. Generator Power – 1.9 MVA

ii. Water:

1. Hotel

- a. 6" domestic water main
- b. Peak = 275 GPM
- c. Average daily flow – 30,000 Gallons per day
- d. Peak Hour = 5,000 gallons

2. Park

- a. 8" domestic water main
- b. Peak = 500 GPM
- c. Average daily flow – 17,100 Gallons per day
- d. Peak Hour = 2,900 gallons

iii. Sewer:

1. Hotel:

- a. 10" sanitary sewer main, or multiple 6" and 8" connections based on coordination with the civil engineer.

2. Park:

- a. 12" sanitary main.

iv. Gas:

1. 80,000 CFH

d. Future Parking Structure:

i. Electrical:

1. Normal Power – 0.5 MVA
2. Generator Power – .2 MVA

ii. Water, Sewer, Gas: Not anticipated.

3. Project Totals

a. Phase 1:

i. Power:

1. Total Normal Load: 13.2 MVA.
2. Total Generator Load: 5.8 MVA.

ii. Water:

1. A peak diversified flow of approximately 515 GPM can be anticipated from the above estimates, which can be provided via a 8" line.

iii. Sewer:

1. A 14" site sanitary main can be anticipated for the above sanitary estimates.

iv. Gas:

1. 61,200 CFH.

- b. Phase 1 and 2 combined:
 - i. Power:
 - 1. Total Normal Load: 23.3 MVA. If this is provided at 13.2 kV, this would equate to 1200A, 15kV service entrance gear being required. As noted above, the load estimated is connected load and the actual demand will be significantly less than this estimate.
 - 2. Total Generator Load: 9.6 MVA. This would require multiple 2.5 MW and 2.0 MW generators in parallel. Locations and quantities would be determined during schematics.
 - ii. Water:
 - 1. A peak diversified flow of approximately 1,400 GPM can be anticipated from the above estimates, which can be provided via a 14" line.
 - iii. Note: the above flow is in regards to domestic water use only. In regards to fire protection water, the IFC would require 6000 GPM for a period of four hours for the entire site. An exception allows a reduction of this by 75%. If it is found that a reliable water source is not provided by the utility, a tank of approximately 360,000 gallons could be necessary.
- c. Sewer:
 - i. A 24" site sanitary main can be anticipated for the above sanitary estimates (entire project)
- d. Gas:
 - i. 158,500 CFH. Actual demand will be significantly less than this and can be further determined during design. A significant gas load has been carried for the water park at this point, which will most likely be reduced once the full scope is known of this portion.

Please review the above information and do not hesitate to contact our office with any questions.

Sincerely,

Exp U.S. Services, Inc.



Paul R. Van Kauwenberg, P.E.
Principal